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IS 12485 (1988): Metal Bonded Seals [PGD 16: Fluid Power]

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UDC 621·762·8 : 621·22

Indian Standard

(Reaffirmed 1998)

SPECIFICATION FOR METAL BONDED SEALS

1. Scope — Covers the dimensions, material, workmanship and other requirements of metal bonded seals for use in hydraulic fluid power system.

2. Dimensions — Shall be as given in Table 1.

3. Material — The outer ring of bonded seal is generally made of mild steel and inside rubbering shall generally be of nitrile butadiene rubber or similar compounds.

3.1 Guidelines for selection of suitable material are given in Appendix A.

4. **Designation** — A bonded seal with d_1 = 5·7 mm, d_2 = 9 mm, thickness H = 1·6 mm suitable for M 5 threads and conforming to this standard shall be designated as:

Bonded Seal 5·7 × 9 × 1·6 M5 IS : 12485

5. General Requirements

5.1 The seals shall be free from cuts, blisters and other manufacturing defects.

6. Workmanship and Finish — The steel ring shall be chromium plated or cadmium plated. The rubber cladding shall not cover the metal portion.

7. Marking — Each packing shall be marked with the following:

a) Designation of the seal,
b) Material of the seal,
c) Number of pieces,
d) Month and year of manufacture, and
e) Manufacturer's name or trade-mark.

8. Packaging — The bonded seals shall be packed as agreed to between the manufacturer and the purchaser.

9. Storage — Bonded seals shall be stored according to Indian Standard Recommendations for storage of seals (*under preparation*).

Note — Till such time the standard under preparation is published, the matter shall be as agreed to between the purchaser and the supplier.

Fluid Power Systems and Components Sectional Committee, EDC 73; Sealing Devices Subcommittee, ECD 73 : 5 [Ref : Doc : EDC 73 (4201)]

Adopted 30 September 1988	© August 1989, BIS	Gr 2

BUREAU OF INDIAN STANDARDS
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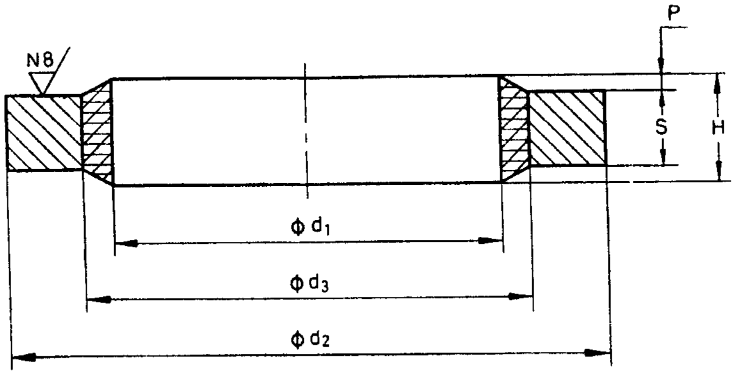
TABLE 1 DIMENSIONS FOR BONDED SEALS

(*Clause* 2)

All dimensions in millimetres.



Nominal Size	d_1 ± 0·1	d_2 $^{+0\cdot13}_{-0}$	d_3	S		P $^{-0\cdot25}_{+0}$	H $^{+0\cdot5}_{-0}$	Suitable for	
				Nominal	Tolerance			Metric Threads to IS : 4218*	Pipe Threads to IS : 2643†
4.5 × 7	4·5	7	5·4	1	± 0·10	0·3	1·6	M4	—
5·7 × 9	5·7	9	6·8	1	± 0·10	0·3	1·6	M5	—
5·7 × 10	5·7	10	7·4	1	± 0·10	0·3	1·6	M5	—
6·7 × 10	6·7	10	8	1	± 0·10	0·3	1·6	M6	—
6·7 × 11	6·7	11	8·2	1	± 0·10	0·3	1·6	M6	—
8·7 × 13	8·7	13	10	1	± 0·10	0·3	1·6	M8	—
8·7 × 14	8·7	14	10·4	1	± 0·10	0·3	1·6	M8	—
10·7 × 16	10·7	16	12·4	1·5	± 0·10	0·4	2·3	M10	—
10·7 × 18	10·7	18	12·4	1·5	± 0·10	0·4	2·3	M10	—
12·7 × 18	12·7	18	14·4	1·5	± 0·10	0·4	2·3	M12	—
12·7 × 20	12·7	20	14·4	1·5	± 0·10	0·4	2·3	M12	—
14·7 × 22	14·7	22	16·4	1·5	± 0·10	0·4	2·3	M14	G 1/4
16·7 × 24	16·7	24	18·4	1·5	± 0·10	0·4	2·3	M16	—
17·4 × 24	17·4	24	19·2	1·5	± 0·10	0·4	2·3	—	—
18·7 × 26	18·7	26	20·4	1·5	± 0·10	0·4	2·3	M18	—
20·7 × 28	20·7	28	22·5	1·5	± 0·10	0·4	2·3	M20	—
22·7 × 30	22·7	30	24·4	2	± 0·10	0·4	2·8	M22	G 1/2
24·7 × 32	24·7	32	26·4	2	± 0·10	0·4	2·8	M24	G 5/8
26·7 × 35	26·7	35	28·4	2	± 0·10	0·4	2·8	M26	—
27·7 × 36	27·7	36	29·4	2	± 0·10	0·4	2·8	M27	G 3/4
31 × 39	31	39	33	2	± 0·10	0·4	2·8	M30	—
33·7 × 42	33·7	42	35·8	2	± 0·10	0·4	2·8	M33	G 1
36·7 × 46	36·7	46	38·4	2	± 0·10	0·4	2·8	M36	—
42·7 × 53	42·7	53	44·4	3	± 0·15	0·4	3·8	M42	G 1-1/4
48·7 × 59	48·7	59	50·8	3	± 0·15	0·4	3·8	M48	

*ISO metric screw threads.

†Dimensions for pipe threads for fastening purposes.

APPENDIX A

(*Clause* 3.1)

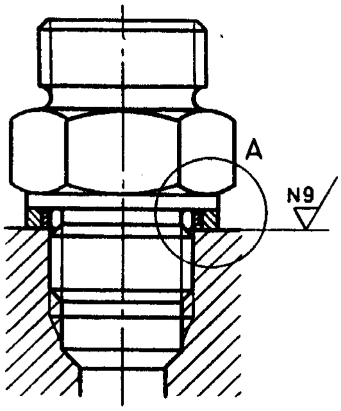
MATERIAL PROPERTIES AND SELECTION GUIDELINES FOR METAL BONDED SEAL

Material Clause	Specification of Compound	Hardness (Shore A)	Minimum Pressure MPa	Temperature Range (°C)	Tensile Strength MPa	Advantages	Disadvantages	Application	Remarks
A	Nitrile-butadiene	75 ± 3	10	— 30 to + 130	10 to 20	1. Low swelling 2. Fair dry running characteristics	1. Lack of exceptional heat resistance	1. For general use in retaining lubricants and excluding mud, dirt, water, etc	Cheap for normal use
B	Nitrile-butadiene	85 ± 3	21	—	—	3. Good processing characteristics 4. Good low temperature characteristics	2. Tendency to harden during high temperature usage	2. High pressure hydraulic and lubricating oil pumps, water lines, gas lines, compressors, and general equipment	Standard quality
C	Vinylidine fluoride and hexafluoropropylene copolymer (viton)	90 ± 3	35	— 25 to + 200	10 to 15	1. Good moderate temperature performance 2. Low swelling 3. If the shaft run cut is low, these may be used at low temperature	1. Poor low temperature properties 2. Poor dry running characteristics	Chemical equipment hydraulic oil with additives and all above applications	Medium cost range
D	Polytetra fluoroethylene	98 ± 1	35	— 200 to + 200	20 to 35	1. Good heat resistance 2. Excellent low temperature properties	—	Refrigerants oxygen aggressive fluids	Extensive, highly abrasionless elastic
E	Silicon compounds semi-organic elastomers	60 to 80	10	— 50 to + 175	5, *Min*	1. Good heat stability 2. Good low temperature properties 3. Low shrinkage factor 4. Low setting properties	The maximum usable temperature is limited by decomposition temperature of lubricants	In general equipment, automobile sealing, etc	High cost range

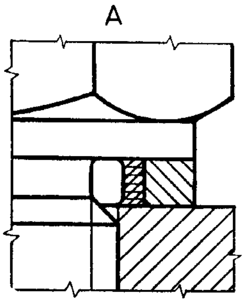
EXPLANATORY NOTE

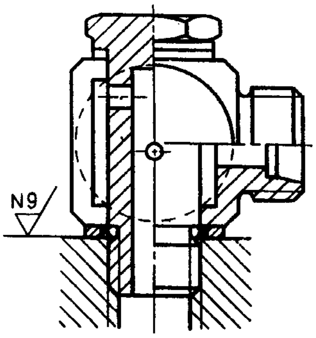
These bonded seals can be used in place of copper washers as specified in IS : 3175-1974 'Specification for sealing washers for pipe unions (*first revision*)' or aluminium washers up to a pressure of 40 MPa. These seals can take more flexibility.

Bonded seals are essentially face seals and are designed for sealing on internal diameter. Where the connection is made, the initial action is to deflect the rubber lips, the tightening and bursting loads being resisted by the steel ring. It is intended to seal stud couplings, screwed plugs, banjos belt heads of flanges, etc. However, it is not intended to prevent the oil from passing up the screw thread of a stud and nut fixing, in which case, a cap or domed nut is used. Typical applications of bonded seals are illustrated below.

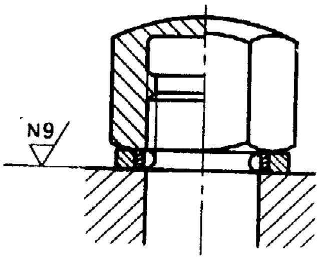


MALE STUD COUPLING





BANJO



This standard has been formulated based on the current manufacturing practices prevalent in the Indian industry.

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